

503.2 Venting systems required. Except as permitted in Sections 503.2.1 through 503.2.4 and 501.8, all equipment shall be connected to venting systems.

503.2.1 Ventilating hoods. Ventilating hoods and exhaust systems shall be permitted to be used to vent equipment installed in commercial applications (see Section 503.3.4) and to vent industrial equipment, such as where the process itself requires fume disposal.

503.2.2 Well-ventilated spaces. Where located in a large and well-ventilated space, industrial equipment shall be permitted to be operated by discharging the flue gases directly into the space.

503.2.3 Direct-vent equipment. Listed direct-vent equipment shall be considered properly vented where installed in accordance with the terms of its listing, the manufacturer's instructions, and Section 503.8(3).

503.2.4 Equipment with integral vents. Equipment incorporating integral venting means shall be considered properly vented when installed in accordance with its listing, the manufacturer's instructions, and Sections 503.8(1) and 503.8(2).

503.3 Design and construction. A venting system shall be designed and constructed so as to develop a positive flow adequate to convey flue or vent gases to the outdoor atmosphere.

503.3.1 Equipment draft requirements. A venting system shall satisfy the draft requirements of the equipment in accordance with the manufacturer's instructions.

503.3.2 Design and construction. Gas utilization equipment required to be vented shall be connected to a venting system designed and constructed in accordance with the provisions of Sections 503.4 through 503.15.

503.3.3 Mechanical draft systems. Mechanical draft systems shall comply with the following:

1. Equipment, except incinerators, requiring venting shall be permitted to be vented by means of mechanical draft systems of either forced or induced draft design.
2. Forced draft systems and all portions of induced draft systems under positive pressure during operation shall be designed and installed so as to prevent leakage of flue or vent gases into a building.
3. Vent connectors serving equipment vented by natural draft shall not be connected into any portion of mechanical draft systems operating under positive pressure.
4. When a mechanical draft system is employed, provision shall be made to prevent the flow of gas to the main burners when the draft system is not performing so as to satisfy the operating requirements of the equipment for safe performance.
5. The exit terminals of mechanical draft systems shall be not less than 7 feet (2134 mm) above grade where located adjacent to public walkways and shall be located as specified in Section 503.8, Items 1 and 2.

6. Mechanical draft systems shall be installed in accordance with the terms of their listing and the manufacturer's instructions.

Comm 65.0503 (1) Additional mechanical draft system requirements.

- (a) All horizontal exit terminals of a gas appliance mechanical draft system shall be located in accordance with IMC Section 804.3.4, items 4 and 5.
- (b) All vertical exit terminals of a gas appliance mechanical draft system shall be located in accordance with IMC Section 804.3.5, items 3 and 6.

503.3.4 Ventilating hoods and exhaust systems. Ventilating hoods and exhaust systems shall be permitted to be used to vent gas utilization equipment installed in commercial applications. Where automatically operated equipment is vented through a ventilating hood or exhaust system equipped with a damper or with a power means of exhaust, provisions shall be made to allow the flow of gas to the main burners only when the damper is open to a position to properly vent the equipment and when the power means of exhaust is in operation.

503.3.5 Circulating air ducts and plenums. No portion of a venting system shall extend into or pass through any circulating air duct or plenum.

503.4 Type of venting system to be used. The type of venting system to be used shall be in accordance with Table 503.4.

503.4.1 Plastic piping. Approved plastic piping shall be permitted to be used for venting equipment listed for use with such venting materials.

503.4.2 Special gas vent. Special gas vent shall be listed and installed in accordance with the terms of the special gas vent listing and the manufacturers' instructions.

503.5 Masonry, metal, and factory-built chimneys. Masonry, metal and factory-built chimneys shall comply with Sections 503.5.1 through 503.5.10.

503.5.1 Factory-built chimneys. Factory-built chimneys shall be installed in accordance with their listing and the manufacturers' instructions. Factory-built chimneys used to vent appliances that operate at positive vent pressure shall be listed for such application.

503.5.2 Metal chimneys. Metal chimneys shall be built and installed in accordance with NFPA 211, or local building codes.

503.5.3 Masonry chimneys. Masonry chimneys shall be built and installed in accordance with NFPA 211, or local building codes and shall be lined with approved clay flue lining, a listed chimney lining system, or other approved material that will resist corrosion, erosion, softening, or cracking from vent gases at temperatures up to 1800°F (982°C).

Exception: Masonry chimney flues serving listed gas appliances with draft hoods, Category I appliances, and other gas appliances listed for use with Type B vent shall be permitted to be lined with a chimney lining system specifically listed for use only with such appliances. The liner shall be installed in accordance with the liner manu-

**TABLE 503.4
TYPE OF VENTING SYSTEM TO BE USED**

GAS UTILIZATION EQUIPMENT	TYPE OF VENTING SYSTEM
Listed Category I equipment Listed equipment equipped with draft hood Equipment listed for use with Type B gas vent	Type B gas vent (Section 503.6) Chimney (Section 503.5) Single-wall metal pipe (Section 503.7) Listed chimney lining system for gas venting (Section 503.5.3) Special gas vent listed for this equipment (Section 503.4.2)
Listed vented wall furnaces	Type B-W gas vent (Sections 503.6, 607)
Category II equipment	As specified or furnished by manufacturers of listed equipment (Sections 503.4.1, 503.4.2)
Category III equipment	As specified or furnished by manufacturers of listed equipment (Sections 503.4.1, 503.4.2)
Category IV equipment	As specified or furnished by manufacturers of listed equipment (Sections 503.4.1, 503.4.2)
Incinerators, indoors	Chimney (Section 503.5)
Incinerators, outdoors	Single-wall metal pipe (Sections 503.7, 503.7.6)
Equipment which may be converted to use of solid fuel	Chimney (Section 503.5)
Unlisted combination gas and oil-burning equipment	Chimney (Section 503.5)
Listed combination gas and oil-burning equipment	Type L vent (Section 503.6) or chimney (Section 503.5)
Combination gas and solid fuel-burning equipment	Chimney (Section 503.5)
Equipment listed for use with chimneys only	Chimney (Section 503.5)
Unlisted equipment	Chimney (Section 503.5)
Decorative appliance in vented fireplace	Chimney
Gas-fired toilets	Single-wall metal pipe (Section 625)
Direct vent equipment	See Section 503.2.3
Equipment with integral vent	See Section 503.2.4
Equipment in commercial and industrial installations	Chimney, ventilating hood, and exhaust system (Section 503.3.4)

facturers' instructions and the terms of the listing. A permanent identifying label shall be attached at the point where the connection is to be made to the liner. The label shall read: "This chimney liner is for appliances that burn gas only. Do not connect to solid or liquid fuel-burning appliances or incinerators."

For information on installation of gas vents in existing masonry chimneys, see Section 503.6.6.

503.5.4 Chimney termination. Chimneys for residential-type or low-heat gas utilization equipment shall extend at least 3 feet (914 mm) above the highest point where it passes through a roof of a building and at least 2 feet (610 mm) higher than any portion of a building within a horizontal distance of 10 feet (3048 mm) (see Figure 503.5.4). Chimneys for medium-heat equipment shall extend at least 10 feet (3048 mm) higher than any portion of any building within 25 feet (7620 mm). Chimneys shall extend at least 5 feet (1524 mm) above the highest connected equipment draft hood outlet or flue collar. Decorative shrouds shall not be installed at the termination of factory-built chimneys except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with the manufacturers' installation instructions.

503.5.5 Size of chimneys. The effective area of a chimney venting system serving listed appliances with draft hoods,

Category I appliances, and other appliances listed for use with Type B vents shall be in accordance with Section 504 or other approved engineering methods.

Exceptions:

1. As an alternate method of sizing an individual chimney venting system for a single appliance with a draft hood, the effective areas of the vent connector and chimney flue shall be not less than the area of the appliance flue collar or draft hood outlet, nor greater than seven times the draft hood outlet area.
2. As an alternate method for sizing a chimney venting system connected to two appliances with draft hoods, the effective area of the chimney flue shall be not less than the area of the larger draft hood outlet plus 50 percent of the area of the smaller draft hood outlet, nor greater than seven times the smallest draft hood outlet area.

Where an incinerator is vented by a chimney serving other gas utilization equipment, the gas input to the incinerator shall not be included in calculating chimney size, provided the chimney flue diameter is not less than 1 inch (25 mm) larger in equivalent diameter than the diameter of the incinerator flue outlet.

IFGC/IFGS CHAPTER 7

REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.8.

ANSI	American National Standards Institute 25 West 43rd Street Fourth Floor New York, NY 10036		
	Standard reference number	Title	Referenced in code section number
Z21.1—96	Household Cooking Gas Appliances		622.1
Z21.5.1—95	Gas Clothes Dryers - Volume I -Type 1 Clothes Dryers.		612.1
Z21.5.2—95	Gas Clothes Dryers - Volume II- Type 2 Clothes Dryers with 1999 Addendum		612.1, 613.3
Z21.8—94	Installation of Domestic Gas Conversion Burners.		618.1
Z21.10.1—98	Gas Water Heaters - Volume I Storage, Water Heaters with Input Ratings of 75,000 Btu per Hour or Less.		623.1
Z21.10.3—98	Gas Water Heaters - Volume III - Storage, Water Heaters with Input Ratings Above 75,000 Btu per hour, Circulating and Instantaneous Water Heaters		623.1
Z21.11.1—91	Gas-Fired Room Heaters - Volume I - Vented Room Heaters—with 1993 Addendum (Replaced by Z21.86-98/CSA 2.32 - M98, Vented Gas-Fired Space Heating Appliances)		621.1
Z21.11.2—96	Gas-Fired Room Heaters - Volume II - Unvented Room Heaters with Addendum Z21.11.2a-1997		620.1
Z21.13—91	Gas-Fired Low-Pressure Steam and Hot Water Boilers—with Addendum Z21.13a-1993 and Z21.13b-1994		630.1
Z21.19—90	Refrigerators Using Gas (R 1999) Fuel—with Addendum Z721.19a-1992 (R1999) and Z21.19b-1995 (R1999)		624.1
Z21.40.1—96	Gas-Fired Absorption Summer Air Conditioning Appliances		626.1
Z21.40.2—96	Gas Fired Work Activated Air Conditioning and Heat Pump Appliances (Internal Combustion)		626.1
Z21.42—93	Gas-Fired Illuminating Appliances		627.1
Z21.47—93	Gas-Fired Central Furnaces—with Addendum Z21.47a-1995		617.1
Z21.48—92	Gas-Fired Gravity and Fan Type Floor Furnaces—with 1993 Addendum (Replaced by Z21.86-98/CSA 2.32-M98, Vented Gas-Fired Space Heating Appliances)		608.1
Z21.49—92	Gas-Fired Gravity and Fan-Type Vented Wall Furnaces—with 1993 Addendum (Replaced by Z21.86-98/CSA 2.32-M98, Vented Gas-Fired Space Heating Appliances)		607.1
Z21.50—96	Vented Gas Fireplaces		604.1
Z21.56—94	Gas-Fired Pool Heaters—with Addendum Z21.56a-1996.		616.1
Z21.58—95	Outdoor Cooking Gas Appliances—with Addendum Z21.58a-1998		622.1
Z21.60—96	Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces		602.1
Z21.61—83 (R 1996)	Gas-Fired Toilets		625.1
Z83.4—91	Direct Gas-Fired Make-Up Air Heaters.		610.1
Z83.6—90	Gas-Fired Infrared Heaters		629.1
Z83.8—96	Gas Unit Heaters—with Z83.8a-1997		619.1
Z83.9—90	Gas-Fired Duct Furnaces—with Addendum Z83.9a-1992		609.1
Z83.11—96	Gas Food Service Equipment (Ranges and Unit Broilers), Baking and Roasting Ovens, Fat Fryers, Counter Appliances and Kettles, Steam Cookers, and Steam Generators— with Addendum Z83.11a-1997		622.1
Z83.18—90	Direct Gas-Fired Industrial Air Heaters—with Addenda Z83.18a-1991 and Z83.18b-1992		611.1
Z223.1/NFPA 54—99	National Fuel Gas Code		Comm 65.0400

REFERENCED STANDARDS

ASME

American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

Standard reference number	Title	Referenced in code section number
ASME—95	Boiler & Pressure Vessel Code	630.1
CSD-1—98	Controls and Safety Devices for Automatically Fired Boilers	630.1

ASTM

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Standard reference number	Title	Referenced in code section number
C 64—94	Specification for Refractories for Incinerators and Boilers	503.10.2.5
C 315—96	Specification for Clay Flue Linings	501.12

IAS

International Approval Services-U.S., Inc.
8501 East Pleasant Valley Road
Cleveland, OH 44131

Standard reference number	Title	Referenced in code section number
IAS 8 - 93	Requirements for Gas-Fired Log Lighters for Wood Burning Fireplaces	603.1

ICC

International Code Council
5203 Leesburg Pike, Suite 600
Falls Church, VA 22041

Standard reference number	Title	Referenced in code section number
IBC—2000	International Building Code®	201.3, 301.10, 301.11, 301.12, 301.14, 302.1, 302.2, 306.6, 501.1, 501.3, 501.12, 501.15.4, 608.3, 613.2
IFC—2000	International Fire Code®	201.3, 303.4,
EC—2000	ICC Electrical Code—Administrative Provisions™	201.3, 306.3.1 306.4.1, 306.5.2, 309.2
IECC—2000	International Energy Conservation Code®	301.2, 303.3
IMC—2000	International Mechanical Code®	201.3, 301.1.1, 301.13, 304.15, 501.1, 613.2, 617.5, 620.1, 623.1, 630.2, 631.1
IPC—2000	International Plumbing Code®	201.3, 301.6, 623.1.1, 623.2

NFPA

National Fire Protection Association
1 Batterymarch Pike
P.O. Box 9101
Quincy, MA 02269-9101

Standard reference number	Title	Referenced in code section number
37—98	Stationary Combustion Engines and Gas Turbines	615.1
82—99	Incinerators, Waste and Linen Handling Systems and Equipment	606.1
54/ANSI Z223.1—99	National Fuel Gas Code	Comm 65.0400
88B—97	Repair Garages	305.3
211—96	Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	503.5.2, 503.5.3, 503.5.6.1, 503.5.6.3
8501—97	Single Burner Boiler Operation	630.1
8502—99	Prevention of Furnace Explosions/Implosions in Multiple Burner Boiler	630.1
8504—96	Atmospheric Fluidized-Bed Boiler Operation	630.1